Energy Reports 2 (2016) 229–236

Contents lists available at ScienceDirect

Energy Reports

journal homepage: www.elsevier.com/locate/egyr

Free energy option and its relevance to improve domestic energy demands in southern Nigeria

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ARTICLE INFO

Article history:
Received 16 May 2016
Received in revised form
14 September 2016
Accepted 14 September 2016
Available online 2 October 2016

Keywords:
Energy
Free energy generators
Renewable energy
Fossil-fuel generator
Life cycle cost analysis

ABSTRACT

The aim of this paper is to seek an energy option that would benefit the growing energy demands. Domestic energy demands in southern Nigeria had increased greatly due to failing power programs and seasonal migrations. The fossil fuel option is gradually fading away due to environmental pollution and recent dynamic cost. The renewable energy option had been celebrated with little success in the coastal area of southern Nigeria. At the moment, the renewable energy option is very expensive with little guarantee on its efficiency with time. The data set used for this study was obtained from the Davis weather installation in Covenant University. The free energy option was considered. The cost and its environmental implication for domestic use were comparatively discussed alongside other energy options — using the Life cycle cost analysis. It was found out that free energy option is more affordable and efficient for domestic use.

1. Introduction

Alternative energy has the advantage that it can be conserved; do not harm or pollute the environment; do not deplete natural resource i.e. it is generated naturally and continuously replenished. The sub-classification of alternative energy is controversial. The generally accepted sub-classification of alternative energy sources include solar, bio-fuels, wind energy, biomass digester, geothermal, hydro e.t.c. Each of the classification shows varying challenges. For example, solar and wind can be affect by regional climate perturbations (Emetere and Akinyemi, 2015). The biomass option is dependent on biodegradable waste which may be gotten from living things or dead organisms. The biomass option has less green house effect on the social or earth surface than fossil fuel. The inclusion of the free energy as an alternative energy may be appropriate depending on its source. However, the free energy option has been suppressed and not considered in the third world countries. Based on established conspiracy theory, it is believed that free energy suppression is linked to government, corporations, or advocacy groups (Robert, 2000). Hence, free energy option has not been seen to be technologically viable, pollution-free, and at no-cost. The inclusion of free energy as a sub-classification of alternative energy may be premised on the known advantages of the later i.e. sustainability, cost, less greenhouse effect, job creation and its economy viability. In this research it was proposed that the free energy option has the potential to meet global energy demands in the third world countries.

Domestic energy demands in southern Nigeria had increased greatly due to failing power programs and uncontrolled influx of migrants from neighbouring countries. The fossil-fuels option is also becoming gradually expensive due to scarcity, dynamic purchasing cost and global fall in crude oil prices. More so, the environmental pollution from the fossil fuel is dangerous because of the massive release of anthropogenic pollution (Emetere and Akinyemi, 2013; Emetere, 2013). Nevertheless, a lot of people patronize the fossil-fuels option because it is available and affordable. The reliance on renewable energy-solar option has proven to be more expensive in the long run. In the study location, solar option is the most patronized. Little awareness is created for other renewable options.

Nigeria's government built only 12 power plants—all of them now in disrepair. At the moment, only 40% of Nigerian electricity consumer are connected to the commercial grid which generate little less than 4000 MW (Owoyemi, 2014). Those connected to the national grid barely have 5 h power supply daily. Aside the usual challenges of very old equipment in the grid, there are lots of issues with the national grid. For example, the major challenge of the national is the dilapidated distribution line as shown in Fig. 1(a)–(d).

Therefore high power loss is expected both in the transmission and distribution lines. In the developed countries, the grid

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http://dx.doi.org/10.1016/j.egyr.2016.09.001

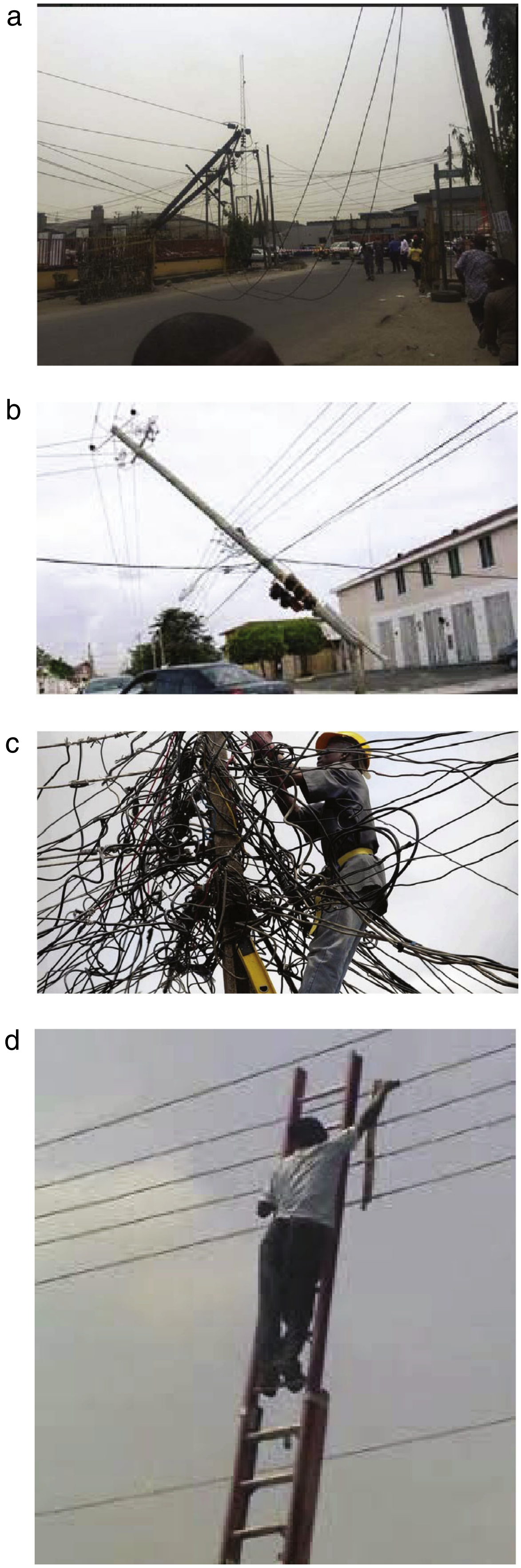

Fig. 1. Different challenges of the distribution line (Unknown, 2014a,b,c,d).

has the following challenges: constructing new transmission lines; recuperating the initial construction cost; connecting the renewable energy generation sites to the power grid; and protecting the grid from physical and cyber security attacks. The challenge of the power grid have all of the above challenges but not limited to: illegal connections; inefficient bill collection system; overhead distribution system which makes it vulnerable to illegal agents; lack of regulations and standards in the distribution sector; century old, legacy bulk power grid; and climate issues. In the light of the above, it is more convenient for consumers to stay-off the national grid to seek a more comfortable way of tackling their individual energy challenges.

The situation at the moment and the economy state of the area cannot permit financial frivolity on the side of the teeming population as they seek to solve their domestic energy demands. The objective of this research is to explore the free energy option as a way to salvage the power generation challenges. In section two, the challenges of the renewable energy options were considered. In section three, we considered a brief introduction on the free energy option. The free energy technologies were considered in section four. The cost implications were discussed in section five. In section six, we made salient recommendation based on already established research.

2. Renewable energy options and its current challenges over study area

The public awareness on the renewable energy option is enormous with a major setback on which of its energy-type is affordable for domestic use only. The most popular renewable energy option is the solar energy option. The performance of the solar photovoltaic (PV) panel in southern Nigeria is plagued with its natural climate system (Emetere and Akinyemi, 2015). The earliest groups of customer who patronized the solar-energy option are already counting their losses. The major challenge of the solar energy option is the durability of its PV panel.

Solar PV panels are made up of solar cells i.e. an array of photovoltaic (PV) cells. The primary requirement for a material to be used for solar cell application is its band gap. The band gap of the solar material is expected to be between 1.1 and 1.7 eV (Tyagia et al., 2012). Solar cells are classified based on their inherent band gap. Types of solar cell includes silicon solar cells, III–V group solar cells, thin films solar cells e.t.c. PV modules do not only convert solar irradiation directly into electric but it also produces plenty of waste heat, which can be recovered for thermal use (Tian and Zhao, 2013). Materials used to fabricate the PV panels are mono-crystalline silicon, polycrystalline silicon, micro-crystalline silicon, copper indium selenide, and cadmium telluride (Razykov et al., 2011). The technology behind Solar panels varies with respect to its manufacturer. Recently, the production solar cell from silicon semiconductor is one of the latest inventions of the PV technologies. The concentrating Solar Power (CSP) technology is another recent technique for improving the functionality of the PV module. A typical CSP-plant consists of three main subsystems: solar collector field, solar receiver and a power conversion system (Jamel et al., 2013). The CSP option includes the collector and the receiver, parabolic trough, solar tower or central receiver, linear Fresnel and dish Sterling (Py et al., 2013). The efficiency of the CSP is high in the tropical region. However, the efficiency of the CSP is greatly reduced in coastal region which is characterized by high convective activity and solar shading. Most importantly, how many persons in the third world can afford CSP for domestic use?

The second renewable option is the wind-energy option. The wind energy potential via mini wind turbine is an ongoing research. The wind data set were collected from the Davis weather station that was positioned 20 m above the ground. We assume

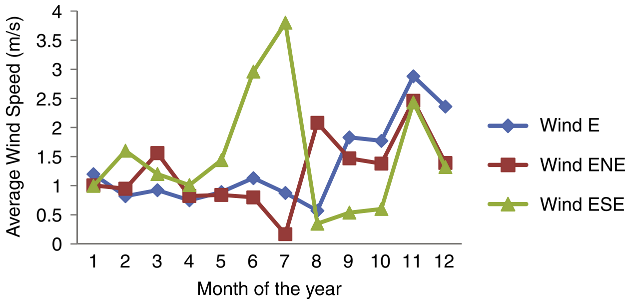

Fig. 2a. Average wind speed for the east orientation wind dynamics.

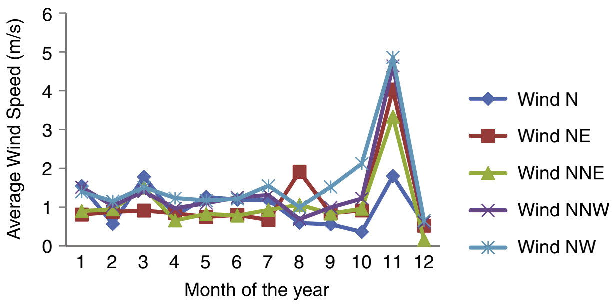

Fig. 2b. Average wind speed for the north orientation wind dynamics.

that the highest domestic buildings in southern-Nigeria are about 20 m. What happens if a customer wants the wind-energy option for his/her domestic needs? Plenary results showed in Figs. 2 and 3 shows the wind analysis and the likely challenges confronting the adaptation of wind energy option. In Fig. 1, the wind data analyses for 2014 were illustrated to show the characteristic feature of wind dynamics in Ota, Nigeria. The analyses were characterized into east orientation wind dynamics (Fig. 2a); north orientation wind dynamics (Fig. 2b); south orientation wind dynamics (Fig. 2c), west orientation wind dynamics (Fig. 2d).

The east orientation is made-up of the east winds, east–north–east winds, and the east–south–east winds i.e.as shown in the legend. The east and east–north–east winds should more stability over time while the east–south–east winds have the highest wind speed in the season. The north orientation wind is made-up of the north winds, north–east winds, north–north–east winds, north–north–west winds and north–west winds. All the components of the north orientation are consistent with the north winds having the highest wind speed. The south orientation wind is made-up of the south winds, south–east winds, south–south–east winds, south–south–west winds and south–west winds. Like the north orientation, the south orientation winds are consistent with the south–east having the highest wind speed. The west orientation wind is made-up of the west winds, west–north–west winds and west–south–west winds. The west orientation wind components are the most consistent of all the orientation. The west wind has the highest wind speed in the west orientation winds.

The east orientation wind dynamics was highest between September and December (Fig. 2a). The north orientation wind dynamics was highest in November (Fig. 2b). The south and west orientations wind dynamics are more active between January and July. The general wind data set for three years (2013, 2014 and 2015) is shown in Figs. 3a,c,d while the power generated from the wind turbine for a period of two years (2014 and 2015) is shown in Fig. 3b.

The higher wind speed noticed in 2013 yielded more power output than in 2014 (Fig. 3b). This means that production in 2015 is expected to be low compared to the previous years.

Also, we conducted an experiment on the two popular PV panel in southern Nigeria i.e. SolarWorld and Sharp Solar (Emetere and

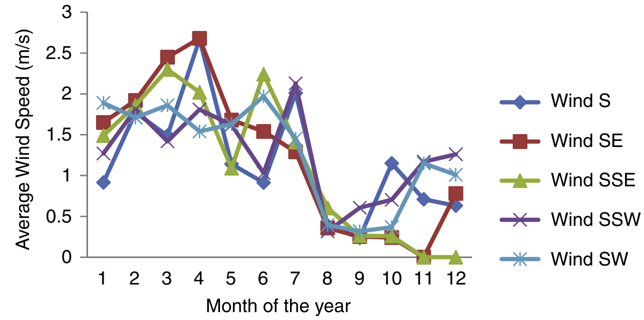

Fig. 2c. Average wind speed for the south orientation wind dynamics.

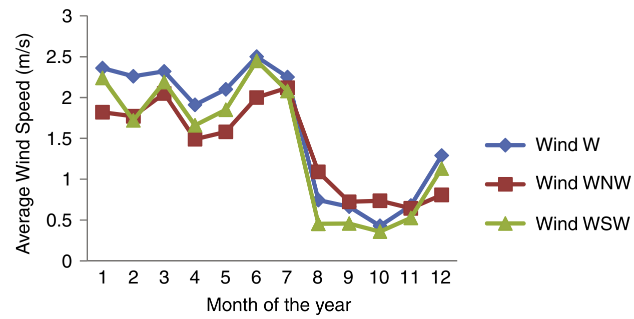

Fig. 2d. Average wind speed for the west orientation wind dynamics.

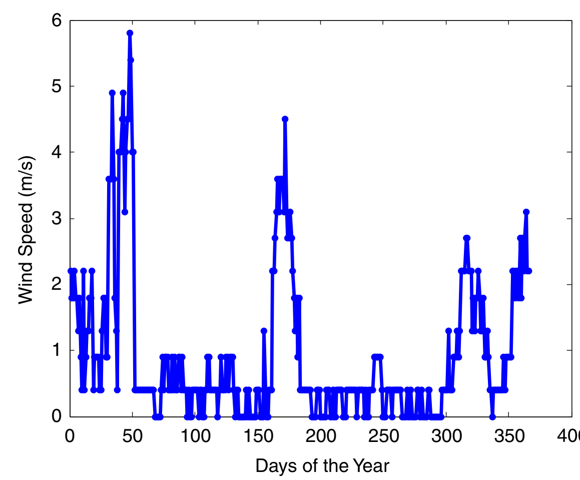

Fig. 3a. Wind data set for 2013.

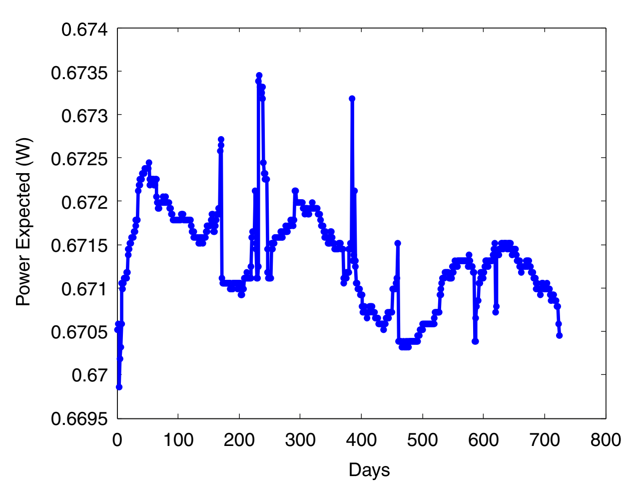

Fig. 3b. Power expected for 2014–2015.

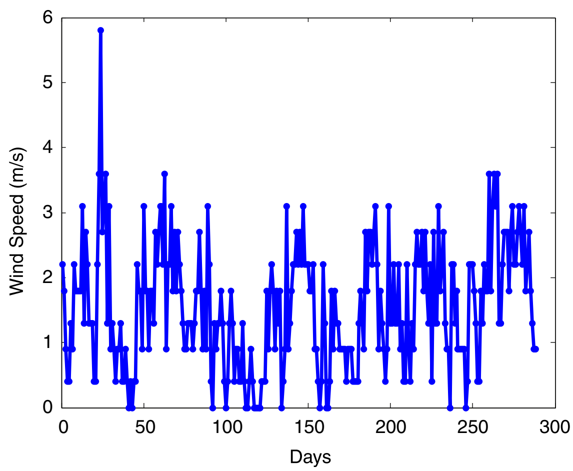

Fig. 3c. Wind data set for 2014.

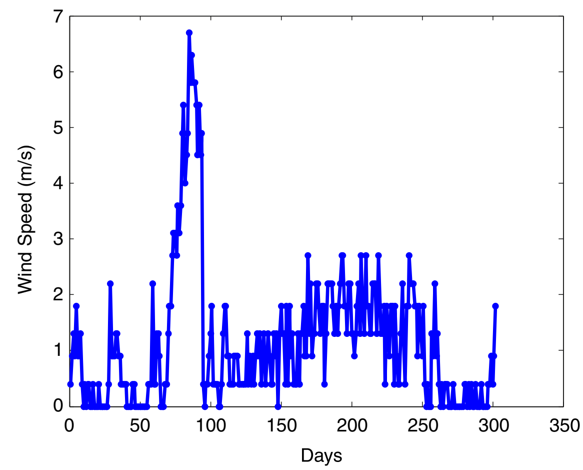

Fig. 3d. Wind data set for 2015.

Akinyemi, 2015). There were two groups of each panel i.e. the dusty and clean panel. The preliminary result as compared with the surface temperature for one of the days is shown in Fig. 4. This explains the challenge the PV panel may face if the same result is replicated consecutively for three years.

The dye sensitized solar cell is still an up-coming aspect of the renewable energy options. Its reliability to meet the domestic energy demands is still premature. We have worked on some projects on same subject (Uno et al., 2015a) and sought ways of maximizing the efficiency of the dye sensitized solar cell (Uno et al., 2015b, 2014).

3. The evolution of the free energy option

Free energy has often been mistaken for renewable energy. Literally, renewable energy is naturally occurring and we have it in abundance. The term 'free energy' is entirely a concept on its own. Casimir effect describes the concept of free energy (Elizalde and Romeo, 1991; Plunien et al., 1986). This effect tries to give a better understanding of why an empty space seems to have energy that has the capacity to cause physical change on a real object. He considered two conducting plates that do not carry electric charge with space in between them. However, the plates need to be very close to each other for the effect to be seen. He realized that if the distance between the two plates is kept small, electromagnetic waves with a wavelength larger than the space between the plates will no longer be able to fit. This causes an imbalance of forces between the plates and its surrounding. In order to solve the pressure created, the plates are being pushed together. Therefore, the smaller the distance between the plates, the stronger the force exerted. This effect is said to have supported the existence of free/vacuum energy theoretically (Razmi and Shirazi, 2015).

Hendrik Casimir, (as well as other physicist) thought differently about the assumption that vacuums are void. He believed

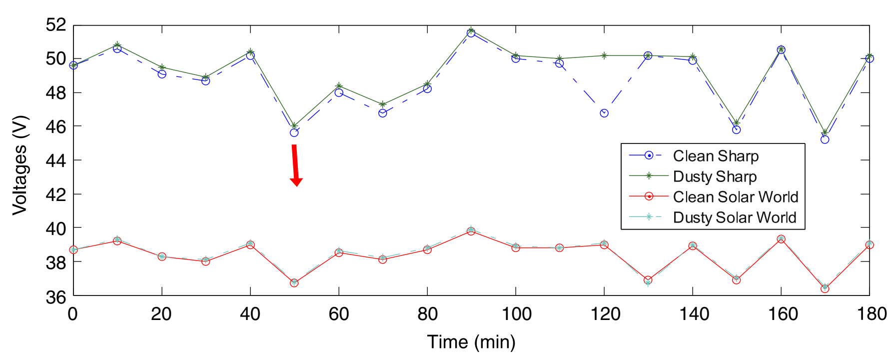

Fig. 4a. Voltage–Time on day four (12:00–15:00 daily).

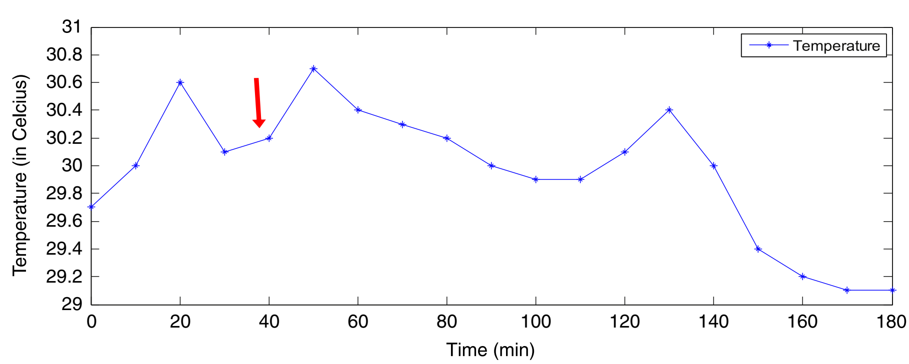

Fig. 4b. Temperature–Time on day four (12:00–15:00 daily).

that fluctuating electromagnetic waves with all sort of possible wavelengths were contained in vacuum. Casimir then suggested that by putting two thin metal plates at an extremely minute distance away from each other in the empty space, vacuum energy can be created and this energy would cause a magnetic attraction/repulsion between the plates (Lawrence, 2015). Free energy devices are classified according to their function and sources. It can be classified into two different types which are; ambient energy devices and Over unity devices. Over unity devices are devices that produce more energy than it uses. In over unity devices, energy input is required but the energy output is usually greater than the amount of energy put in. The devices are potentially capable of producing cheap power, different modes of transport and generally benefitting the society. Free energy devices are not capable of producing energy themselves but are able to trap a large amount of unlimited supply of energy from the universe.

Free energy can somewhat be classified as an alternative energy source. Free energy is energy obtained from naturally existing phenomenon. The purpose of discovering ways to acquire free energy is to produce machines or improve on already existing machines and make them run with more accuracy and at lower cost with little or no need for maintenance cost and these machines/ technologies will at the same time have no negative effect or cause damage to the environment. Free energy can be obtained from various sources; free energy in thermodynamics, free energy in biochemistry, free energy in magnetic field, free energy in electrochemistry, and free energy in biology.

4. Free energy technology

There are so many application of free energy in modern technology, ranging from wind generators to solar panels to pad charger to home earth heaters and so many others, some would be considered below. Free energy Technologies includes the magnetic motor, Quantum Energy generator, Black light's sun cell, Kiril Chukanov's Quantum free energy generator, Solar hydrogen Trend's hydrogen reactor. Magnetic motor device operates on neodymium permanents magnet's principle. The magnet does not exert any power instead, the electric pulse that produces the magnet, straightens the atoms within the iron thereby creating a magnetic dipole which has the same effect as the electric dipole of a battery. The difference between the ordinary motor and electric coils is that electric coils generate the magnetic field. These coils waste the power by turning it into heat and the ordinary motor needs continuous supply of electric power in order to maintain the magnetic field. So there has to be a constant flow of electric energy to balance the loss of energy. Whereas, the former has no coils and thus, can be utilized as a free energy generator. In this case, the force moving the rotor is produced by using the permanent magnetic field of the magnets. The advantage of using the magnetic motor generator is the fact that no external power source is required, therefore made cheaper. However, it has a disadvantage of not being controlled electrically. Quantum Energy generator was discovered by Nikola Tesla about 100 years ago (Hopegirl, 2016). This energy generator does not operate with fuel and uses about 1 kilowatt (kW) of power to produce about 10 kilowatts (kW) of energy. It generates its energy from the environment—vibrations, resonance and energy of frequency from the environment.

Black light's sun cell technology was discovered by a scientific organization named Black light power Inc. This device is said to generate electricity directly from water in the atmosphere (because the atmosphere has water content and this device changes hydrogen from water to some form of energy; gas plasma). The sun cell is capable of producing 100 billion watts from one liter of water. The Kiril Chukanov's quantum free energy generator is a device which has the ability to create ball lightning that can be used as an energy source. Solar hydrogen Trend's hydrogen reactor is a device made by solar hydrogen Trends Inc. and it generates energy from splitting water into hydrogen atoms and oxygen atoms and then uses the hydrogen atoms to generate energy (Mills et al., 2013, 2014).

A German student Dennis Siegel was able to construct an electromagnetic harvester that gathers free electricity from the air. It soaks radiation from the environment, and it is able to recharge an AA battery. Using this he was able to gather free electricity from his environment. He was able to gather electricity from smart phones radiation, emission from WIFI routers, all sorts of machines and also power lines. This student was able to produce two versions of this harvester. One was of a low frequency while the other was of a very high frequency. The one of low frequency had a frequency range of about 50/60 HZ signal, while the one with higher frequency has a frequency range of megahertz and gigahertz of radiation. He made use of the principle used in wireless transfer, that is, electrical current is produced when it passes through a wire coil. Chinese scientist in 2007 invented the cosmic energy machine by reversing the Tesla application of free radiant energy. It extracts energy from gravity using the already corrected pendulum theory. The cosmic energy machine was also used to make a car that does not require fuel to power it (Tseung et al., 2007). Summarily, the free energy project could be in large or small scale. In this paper, we are more interested in the small scale free energy project.

5. Cost of constructing free energy generators for domestic use

In this section, the specification of available free energy generator and its rough cost is listed in Table 1. The market price, local price, capacity and affordability were considered. The local price is the financial estimate if the free energy generator is to be constructed locally. Interestingly almost all its parts can be found in the market. However, the component mentioned under the local price may not be the entire component in the generator. Since this is not a design research we categorize other missing parts under 'body parts'. It should be noted that the bike generator in market is more of supportive generator, so it not efficient to power the household appliances. The local price given in Table 1 is for generator that could successfully power at least, the television, six energy saving bulbs and a fan for one-bedroom apartment. Definitely a higher capacity generator would cost more.

The cost and benefits of energy consumption in the third world country is dynamic in all cost factors that may be considered. This cost factors are equipment costs, financing costs, total installation cost, operating cost, maintenance costs and the levelised cost of energy (LCOE). The key driver for the choice of energy in the third world countries (TWC) is availability and affordability. The analysis of costs in TWC is very difficult obtained, hence, we adopted the simplified approach (IRENA, 2012) of the International Renewable Energy Agency (IRENA). The simplified approach is based on three indicators: equipment cost; total installed project cost; and the levelised cost of electricity (IRENA, 2012). The equipment cost as is more consistent than the installed project cost and LCOE because it is less dependent on the energy technologies and country. Equipment cost depends on a discounted cash flow which is a function of the time value of money. The LCOE is dependent on the competitive features of the utility scale. For example, solar PV module prices in 2014 were around 75% lower than their levels at the end of 2009 (IRENA, 2012). In the TWC, the prices of solar PV module dropped less than 30% due to importation cost and currency exchange fluctuations. Unlike the LCOE of solar PV module, the LCOE of biomass, geothermal and hydropower have been broadly stable (IRENA, 2015). The total installed project costs of alternative power generation varies by country and region. Hence it is expected that the total installed project costs should

Table 1
Cost analysis of free energy generators.

Type	Market price	Local price	Affordability	Capacity
Bedini free energy generator	Not officially on sale	✓ Multivibrator circuit ✓ 2 amplifier ✓ Motor ✓ Transistor ✓ Battery ✓ Electromagnets ✓ Capacitor ✓ Resistor ✓ Shaft ✓ Body parts **Rough cost $559**	Yes	Power full home utility (Bedini, 1984)
Bike generator	On sale **Rough cost $369**	✓ Multiplier ✓ 2 amplifier ✓ Transistor ✓ Battery ✓ Electromagnets ✓ Capacitor ✓ Diodes ✓ 15,000 V neon transformer ✓ Shaft ✓ Body parts **Rough cost $563**	Yes	Power full home utility (Bluejay, 2015; Convergence Tech, 2016)
Free energy Muller motor generator	Not officially on sale	✓ Rectifiers ✓ Hall switch ✓ Converter ✓ Battery ✓ Magnets ✓ Capacitor ✓ Diodes ✓ 15,000 V neon transformer ✓ Shaft ✓ Body parts **Rough cost $543**	Yes	Power full home utility
Chas Campbell device	Not officially on sale	✓ Magnet ✓ Flywheel ✓ Rectifier ✓ Battery ✓ Magnets ✓ DC Motor ✓ Diodes ✓ Pulse circuit ✓ Shaft ✓ Body parts **Rough cost $572**	Yes	Power average home utility (Tseung, 2007, Lawrence, 2015)
Papp engine	Not officially on sale	✓ Chas Campbell system ✓ Tesla switch ✓ Phi transformer ✓ Battery ✓ Clem motor ✓ Yves Mace isotopic generator ✓ Shaft ✓ Body parts **Rough cost $587**	Yes	Not known
Dipole transformer generator	Not officially on sale	✓ Dipole ✓ Induction coil ✓ Capacitor ✓ Battery ✓ Dielectric separator ✓ Inverter ✓ Plasma tube ✓ Shaft ✓ Body parts **Rough cost $537**	Yes	Not known
Zilano free energy generator	Not officially on sale	✓ Neon sign transformer ✓ DC motor ✓ C1 primary tuning HV capacitor ✓ Electromagnets ✓ Capacitor ✓ Diodes ✓ Shaft ✓ Body parts **Rough cost $563**	Yes	Power 2 full home utilities (Vrand, 2015)

(continued on next page)

Table 1 (*continued*)

Type	Market price	Local price	Affordability	Capacity
Quantum energy generator	Not officially on sale	✓ Drive motor ✓ Inverter ✓ Capacitor ✓ Coil ✓ Electromagnets ✓ Fiberglass ✓ Magnet wire ✓ Shaft ✓ Rectifiers ✓ Variac ✓ Rotor ✓ Body parts **Rough cost $563**	Yes	Power full home utilities (Unknown, 2014d, 2015b)

Table 2
Comparative annual Life-cycle cost for energy options.

Energy option		L_{cc} ($)	C ($)	P_{ve} ($)	P_{vr} ($)
Fossil fuel generator		**6160.0**	500.0	5760.0	100.0
Renewable energy	Solar option	**1295.0**	845.0	500.0	50.0
	Wind option	**1350.0**	920.0	500.0	70.0
Free energy		**1190.0**	720.0	600.0	30.0

be more dynamic in the TWC. It is based upon this established financial principle; the estimation given in Table 1 was calculated based on available cost data.

The Life-cycle cost analysis was adapted to comparatively demonstrate the most cost-effective option among different competing energy alternatives. Hence, we considered the fossil-fuel option, the renewable energy option and the free energy option. The basic formular for Life-cycle cost analysis is given as

$$L_{cc} = C + P_{ve} - P_{vr}. \quad (1)$$

Here L_{cc} is the Life-cycle cost, C is the year 0 construction cost, P_{ve} is the present value of all recurring costs and P_{vr} is the present value of the residual value at the end of the study life.

The Life-cycle cost is shown in Table 2. The new load list of the household are television, ten energy saving bulbs, a small fridge and two fans (possibly to power a two or three bedroom apartment). The free energy option has the lowest Life-cycle cost. However, the cost of maintenance depends on the strict adherence to the minimum capacity of the generator. If larger household equipments are factored into the energy budget, Agajelu et al. (2013) proved through the Life-cycle cost analysis that the fossil-fuel would be more economical. We propose that this result would be replicated in other southern part of Nigeria. However, it is important to state that one of the disadvantages of free energy generators is the noise level which is about 65 dBA@7 m when there is no load (Unknown, 2014d, 2015b)

6. Conclusion

Aside the low Life-cycle cost for both alternatives under the renewable energy option, the weather conditions in southern Nigeria may raise the maintenance cost by 200%. The fossil-fuel generator is the device with a very low cost of purchase. However, its maintenance cost is high excluding the unquantifiable cost of stress to purchase scarce fuel in the third world. Aside, the cost, the environmental pollution of fossil fuel can no longer be tolerated. The free energy option has the lowest Life-cycle cost. However, the cost of maintenance depends on the strict adherence to the minimum capacity of the generator. The construction of free energy generator to meet the domestic energy demand in southern Nigeria is the best option and do not depend on geographical weather. Therefore it is expedient for the government and private investors to fund the mass production of free energy generators. The market population is huge and the potential for huge financial gain is inevitable both in the long and short term.

Acknowledgment

The author appreciates the partial sponsorship of Covenant University (CU-CUCRID-201601330).

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